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VASECTOMY

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BY

REGINALD HARRISON

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PREFACE

As I am asked for reprints of papers, which have recently appeared in *The Lancet* (August 5, 1899; May 5, 1900; and July 14, 1900) I have comprised them in this form. My Report to the International Congress of Medicine (1900) on Urethro-stenosis is also added.

To meet requests for other references I have included a list of my works and papers on Surgical Subjects.

6 Lower Berkeley Street,
Portman Square, W.

October 1900.

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SOME STRUCTURAL VARIETIES OF THE HYPERTROPHIED PROSTATE RELATIVE TO TREATMENT

THOSE who have carefully watched the developments which have taken place in the treatment of hypertrophied prostate must have been struck with the variable results which have followed and the different opinions which are held in reference to them. In my Bradshaw Lecture in 1896, when dealing with this point, I ventured to say that, if vasectomy and castration in relation to prostatic enlargement had done no more than direct attention again to its pathology, they would have served a useful purpose.

Within a comparatively short period the following methods have all been submitted to considerable trial: (1) prostatomy, or division of the floor of the gland from the perineum, much on the same principle as an external urethrotomy or perineal section is performed; (2) paracentesis or tapping of the atonic or unemptied bladder through the hypertrophied prostate, followed by drainage; (3) McGill's supra-

pubic prostatectomy ; (4) castration ; and (5) vasectomy. Bottini's operation by the galvano-cautery has also been revived. As I am in some degree responsible for three of these—viz. No. 1,* No. 2,† and No. 5,‡—I have naturally watched the course of events with more than usual interest and taken considerable pains to follow out the subsequent history of many of the patients submitted to these various methods of treatment.

Looking back at the experience which has thus been gained and the successes and failures which have followed, I do not think that there can be much doubt but that the latter are mainly due to the somewhat indiscriminate application of the process which happened to present itself at the time. The more recent experience connected with castration and vasectomy appears to add force to this conclusion, and to indicate on further reflection that there are many variations with broad distinctions in what we are accustomed to speak of, somewhat generally, as the senile or hypertrophied gland.

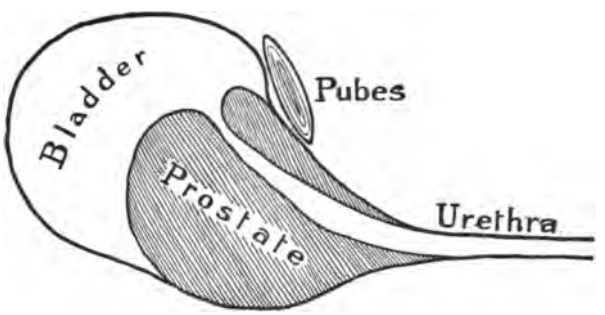
To appreciate this more fully we have only to go to a museum of pathology or, if further proof is required, to study living examples as they are

* "Transactions of the International Medical Congress," Copenhagen, 1884.

† *Brit. Med. Jour.*, 1881, 1882. ‡ *Ibid.*, 1893.

furnished by the surgical examinations which are necessary for the purpose of remedying diseased conditions of the bladder arising out of urination being seriously obstructed by the prostate. With so much variety in the same genus it is unlikely to suppose that we shall find a single process of cure applicable to all the sub-orders any more than we

FIG. 1.



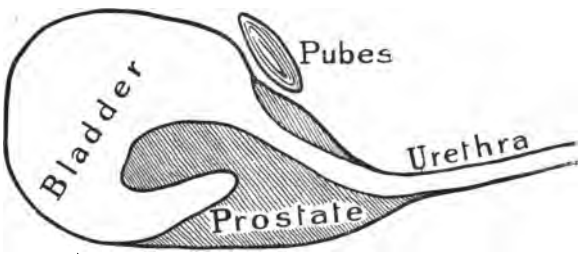
Common form of Prostatic Enlargement.

could logically expect it for herniæ or for the various forms of benign enlargement which the female breast may present. I have now passing before my mind at least three distinct and not uncommon forms of enlarged or hypertrophied prostate as met with in elderly men to which I will briefly refer for the purpose of illustration.

First, enlargement mainly proceeding from blood engorgement more or less chronic in its nature, where the prostate is assimilated with some of the charac-

teristics of an erectile structure as observed in the penis and elsewhere. This condition may explain some of the nocturnally recurring symptoms which characterise the earlier developments of prostatic hypertrophy. When seen in the course of a supra-pubic exploration of the bladder, the projecting lobe or lobes with the internal meatus of the urethra on

FIG. 2.



Pedunculated Prostate.

the upper surface sometimes resembles the glans penis in a very congested state (Fig. 1).

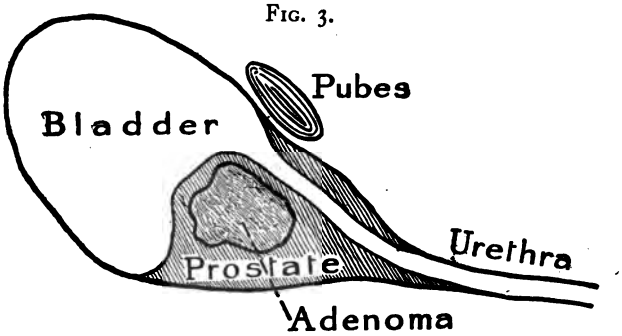
Secondly, the fibrotic prostate, where the enlargement ultimately takes the shape of a pedunculated mass or masses of degenerated connective-tissue and muscular fibre, with but little in common in structure with the preceding variety. In this condition the symptoms are usually those of much local irritation not unlike what a stone excites (Fig. 2).

Thirdly, where the enlargement of the prostate may be said to be self-contained, and consists of an

almost isolated mass of prostatic tissue resembling an adenoma,* which, like the kernel of a nut, easily shells out and can thus be enucleated (Fig. 3).

What analogy, would I ask, pathologically or surgically, is there between these three conditions other than that at one time they each represented a healthy prostate? Or, what common feature do they

FIG. 3.



Adenomatous Prostate.

present for the employment of any one special method of treatment, hitherto discovered, besides the liability, from the size the prostate may attain, to obstruct micturition and so to render the use of a catheter necessary? What good would be likely to accrue if the patient suffering from the greatly engorged prostate were submitted to a suprapubic prostatectomy, with the risk of hæmorrhage and an incomplete removal, which under these circumstances would thus be

* "Transactions of the Royal Medical and Chirurgical Society," vol. lxv. Paper by the Author.

incurred? Or, in the other instances I have taken, what would probably result if the patient with the adenomatous-like obstruction were vasectomised or the one with the pendulous fibroid or fibroids were castrated? Practically *nil*. The published experience of the past few years relative to the several operations just referred to is sufficient to suggest answers to these interrogatories.

Putting aside as foreign to this paper the great majority of prostatic cases which are amenable to the catheter and the like expedients and do not require operative treatment, for the reason that they get on fairly comfortably without it, my belief is that in vasectomy, McGill's suprapubic prostatectomy, bladder drainage, and possibly castration when the testis is diseased, we now have at our disposal reliable means for dealing with exceptional forms of this obstruction, subject to discrimination in their use when the gland is not of a malignant or cancerous nature.

Recognising the difficulty in precisely determining these several limits, it should be remembered that vasectomy occupies a different position to the others I have mentioned. When practised under certain conditions, as I have observed in a considerable number of cases operated upon and recorded, it has never been followed by any kind or degree of harm,

so far as I am aware.* Together with this it has seldom failed to relieve the patient, though not always to the same extent. When this has been the case it was for reasons, I believe, such as have already been indicated, and then it left matters either *in statu quo* or open to any other course that seemed advisable. The same cannot be said in respect to other operative expedients of this nature.

These measures, however, will be demanded by the urgency of the strain on the urinary system relative to micturition, without reference to any inability that may follow so far as the other factor in the dual function is concerned. Castration, whatever its effects on the prostate may be, extinguishes both desire and capacity, whilst vasectomy only appears to render fecundation impossible by the closure of the seminal ducts. Vasectomy should so far as possible be limited to the larger class of cases which are comprised in the first group, whilst those included in the second and third, by reason of their structural dispositions, have, I believe, furnished the instances in which prostatectomy has been practised with considerable success.

A few words may be added in reference to the individual cases to which these operations have been

* "Selected Papers on Stone, Prostate, and other Urinary Disorders." Churchill, 1899.

applied. Vasectomy has been largely successful in diminishing vesical irritability whether associated with catheter life or not. Hardly an instance was observed by me where this was not the case. Thus it constantly happened that the necessity for using the catheter became less frequent after it and the patient was able to obtain sufficient and continuous rest and sleep. Further, it was found, particularly in old hospital cases, that it enabled people to undertake work which their ailment previously interfered with. Similarly, in many instances it seemed to have averted resort to the catheter, or, more properly speaking, to catheter life—a life which when once commenced is seldom ended. By diminishing the size of the prostate it frequently rendered the use of the catheter tolerable and easy, and thus prevented irritation and hæmorrhage, which had previously been connected with this process. In other instances it was noticed that, though it failed to restore natural micturition, it was followed by a partial restoration of this function, which gave the individual a greater degree of independence relative to his daily occupations, and thus freed him from absolute slavery to the catheter.

Cases where fœtid states of the urine, bladder, and kidneys from long-continuing prostatic obstruction and inflammation and where drainage was a necessary part of the treatment often greatly benefited by

suprapubic cystotomy. In several of the latter a removal of a portion of the large prostate which had become fibroid was successfully accomplished.

The following case is one that illustrates the points I desire to give some prominence to in this paper. It was that of a man whose vasa I divided early in 1894. He was sixty-four years of age. He had great irritability of the bladder, was entirely dependent on his catheter, which he used a dozen times or more in the twenty-four hours, and his urine was offensive and purulent in spite of careful irrigation. He derived so little benefit from vasectomy that, after waiting three months, and thinking that he might have an encysted stone somewhere behind his prostate, I opened the bladder for exploration above the pubes. All I found was a pendulous fibroid connected with the third lobe of about the size of a small pigeon's egg, which I readily twisted off (*vide* Fig. 2). Drainage was continued for ten days, and the wound readily closed. The patient made a good recovery. When I last saw him, about twelve months ago, he was very well and active, and could expel the larger quantity of his urine spontaneously. His bladder was tolerant, and though he could not empty it completely, he had not found it necessary to pass his catheter more than once in the twenty-four hours since the operation, and this he did quite

easily. He had for a long time given up washing out the bladder, as the urine was quite normal. This was a typical case for suprapubic prostatectomy occurring in a well-preserved man in vigorous health, and where a pendulous outgrowth from the prostate was tormenting him just as a stone would do.

VASECTOMY RELATIVE TO ENLARGED PROSTATE AND BLADDER ATONY

In the previous article I ventured to state that "if vasectomy and castration in relation to prostatic enlargement had done no more than direct attention again to its pathology they would have served a useful purpose," and I took the opportunity of illustrating some varieties in shape and structure that were included in the term "hypertrophied prostate." Hence I urged that it was about as reasonable to expect to find a uniform treatment for it as it would be in the case of what "enlarged breast" might be made to express. The mass of material which the student of morbid anatomy has now within his reach calls from time to time for its application to the purposes of classification and treatment. In no department of work is this more necessary than in the case of the urinary organs, from whatever portion of the entire apparatus it is viewed.

It has been extremely interesting to follow the

various communications that have been made during the last few years relative to the employment of vasectomy and castration in the treatment of prostatic hypertrophy. In some cases the results have been admirable, in others doubtful, whilst between these two extremes there have been various gradations.

In my own practice, since my advocacy of vasectomy in 1893, I have performed the operation in over a hundred cases, and I can say that, whatever effects were exercised upon the prostate, I have never seen any harm result or heard of any regret expressed from what followed, other than that arising in a few instances from failure to obtain by comparison all the good that might have been anticipated. A number of these cases have now been under observation, or cognisance, for from one to seven years, so that ample opportunity has been permitted for noting what happened during varying intervals after operation.

I have already referred to a previous communication in which stress was laid on the fact that there were structural conditions of the prostate when enlarged where shrinkage was unlikely to happen after either castration or vasectomy, as illustrated by carcinomatous, fibrotic, and adenomatous glands. These all simulate the commoner form of prostatic hypertrophy, and though vasectomy does no harm it

is rarely followed in these instances by appreciable good.

The present article has for its main object the demonstration of the existence of certain physical changes in the bladder, arising out of chronic prostatic obstruction, which are sufficient to negative or minimise the effects that would otherwise follow the induction of shrinkage of the prostate by such means as are under consideration. This point presents itself in three ways : (1) from the examination after death of persons who had undergone vasectomy or castration for hypertrophied prostate ; (2) from the exploration of the interior of the bladder by suprapubic cystotomy under similar circumstances ; and (3) from the examination of collected specimens illustrating various kinds of atonic bladders in persons who had been more or less dependent on the catheter with hypertrophied prostates.

Of the first mentioned I have met with two examples, and of the second four. In five of these vasectomy, and in one castration, had been practised some months previously. In none of them was death caused or the operation of cystotomy necessitated by the vasectomy or castration, these events being brought about by independent derangements of the kidney or the bladder which arose out of the

original state of chronic prostatic obstruction. All instances showed evidence of varying but marked degrees of prostatic shrinkage, though the complications mentioned were uninfluenced. All had benefited to some extent from the shrinkage of the gland which had thus been artificially induced, though the improvement was chiefly confined to matters relating to catheterism and washing out the bladder; but none of these six cases had resulted in the restoration of the natural function of micturition or of catheter independence. The examination of the third group, which included a considerable number of atonic bladders associated with enlarged prostate removed after death from patients who had been more or less dependent on the catheter for long periods of time, indicated the nature of the commoner lesions met with in the bladder under the latter circumstances.

From one or other of these sources I was able to demonstrate (1) that the usual effect of vasectomy is to induce shrinkage of the hypertrophied prostate; (2) that though this shrinkage affords a readier access to the bladder for catheters and such-like purposes it did not necessarily follow that voluntary and natural micturition was thereby restored, failure in this respect being mostly due to structural changes in the bladder itself arising out of long-continued

obstruction; and (3) that the latter consists of certain kinds and degrees of sacculation, pouching, and trabeculation of the bladder whereby its voluntary expulsive power is permanently and frequently irrecoverably damaged.

That the usual effects of vasectomy on the hypertrophied prostate is to bring about in the course of time its shrinkage or atrophy is, I think, generally admitted. Further, it would seem that if the prostatic shrinkage thus induced is not followed by the cessation or improvement of the symptoms characteristic of prostatic obstruction, and which includes the return of natural micturition, it may be assumed that either the gland itself is at fault in other ways, as indicated in my previous paper, or that the bladder is now solely responsible for the failure.

The examination of the cases and specimens referred to previously in the three groups indicates that by far the commonest cause of bladder failure under these circumstances does not necessarily arise out of deterioration or loss of muscular substance requisite for expelling urine, but is largely due to altered relationships between the mucous and muscular investments of the viscus. Take, for instance, as illustrations of the latter the sacculated, pouched, trabeculated, and herniated mucous coat bladders which are the common results of protracted obstruc-

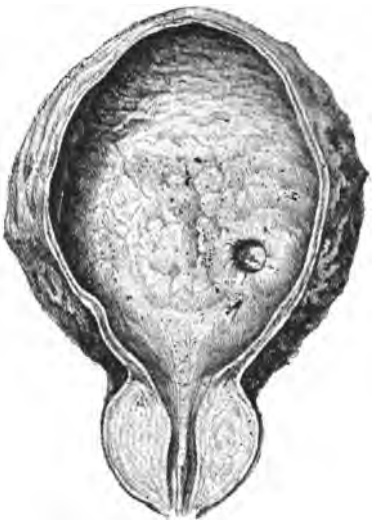
tion. The power is there, but it is misdirected. The mode in which a comparatively small sac in the bladder is capable of throwing the whole muscle "out of gear," to use a very apt term, is capable of demonstration in various ways.

Some years ago I saw a man, under fifty years of age, without any stricture or prostatic obstruction, who had met with an accident whilst hunting, and was partially thrown from his seat, when there was reason for believing that he had a distended bladder. He experienced some pain in the region of the bladder immediately, but was thought at the time not to be seriously hurt. Some weeks afterwards I was consulted by him for offensive urine and for difficulty in emptying his bladder, for which, since the accident, a catheter had been necessary. Eventually he became entirely dependent on the latter, and died in the course of a few months from chronic cystitis. A herniated pouch of mucous membrane just above the trigone which would admit the last joint of the thumb, not unlike the appearance presented in this specimen of a sacculated bladder (Fig. 4), revealed the primary cause of his illness from his accident to his death. There was no evidence during life or after death of spinal injury. It was clear that this protrusion of a pouch of mucous membrane through the meshes of the muscular coat

had brought the natural function of the bladder somewhat abruptly to an irreparable end.

Again, from time to time I see a man, aged fifty years, from whom I removed a single urate stone of about the size of a small walnut, situated, or rather

FIG. 4.



Orifice of Saccule.

embedded, in a pouch just within the posterior wall of the bladder. The operation consisted in seizing the stone (which could only be felt with the side of a sound) with the lithotrite and putting it in a part of the bladder area where it could be readily broken into fragments and removed with the wash-bottle and evacuator. The embedded condition of the stone

had previously interfered with the patient's expulsive powers, and he was, before I saw him, much dependent upon his catheter, though he had no large prostate to account for this. After the stone was removed from the sac, though he was completely relieved from pain and regained his general health, he became entirely dependent upon his catheter—a circumstance which could only be explained by the structural alteration the bladder had thus undergone, and which at his age is not likely to be remedied. I have had more than one instance of this, and have recently reported two cases* where I had endeavoured to deal directly with sacs complicating vesical stone, but with only partial and temporary success.

Further, I have met with several instances in young males suffering from chronic strictures of the urethra where the strictures have led, as a consequence of straining, to the formation of comparatively insignificant sacs in the bladder which have so completely disarranged the expulsive mechanism of the viscus as to render the patients dependent upon catheters, with not much chance of ever regaining complete voluntary power, even after the stricture has been successfully treated.

* Two cases where Multiple Calculi were removed from large Narrow-necked Sacculi connected with the Male Urinary Bladder. "Transactions of the Royal Medical and Chirurgical Society," vol. lxxxii., 1899.

Though it might at first sight seem a somewhat strained illustration to take, it may be said, I believe, that if the heart as the motor power of circulation were liable to undergo only a small portion of that structural damage which is not infrequent in the bladder as a consequence of opposition to its action, the average duration of human life would be curtailed. There is not much to choose between the difficulty of repairing a heart-valve or a bladder-wall structurally, as the case may be.

If these are some of the commoner effects of continued obstruction on the part of the prostate relative to micturition, they seem to suggest that efforts might be directed to averting such consequences by bringing about artificially a shrinkage of the initial cause of obstruction at an earlier period than has hitherto been generally attempted. Some of the experience which I incidentally referred to before in this paper, and which is mainly derived from watching cases for several years, has an important bearing upon this point.

The best results of vasectomy have been met with in cases which may be said to have been on the border-line of the development of those structural bladder changes which the continued use of a catheter does not tend to remove, and which renders the instrument a necessary though an inconvenient insti-

tution. In at least a dozen cases what is known as "catheter life" appears to have been permanently averted by vasectomy. These cases included persons who were prepared to take a reasonable chance of avoiding the probability of being dependent on the use of a catheter for the rest of their lives, as well as others whose condition or usual employment rendered the attainment of this object a particularly desirable one.

Latterly I have further simplified the process of breaking the continuity of the vasa by substituting torsion for section, with a pair of Spencer Wells' forceps, through a small incision over the duct. In this way the vas is seized and bared and a small portion of it is torsed out, no ligature being required. A suture for the skin wound and a collodion application on gauze completes the dressing. A week or ten days' interval in dealing with the two vasa is advised.

So far as the function of the vasa is concerned, in contradistinction to what applies when castration is selected, I can only repeat with additional emphasis what I have already written,* to the effect that the latter extinguishes sexual power whilst vasectomy does not necessarily appear to do so, though it obliterates the seminal ducts.

* "Stone, Prostate, and other Urinary Disorders." Churchill, 1899.

In conclusion, from this and from my previous paper the following deductions may be made: First, that vasectomy has been shown to be specially effectual in the earlier stages of prostatic hypertrophy in effecting shrinkage of the gland and the restoration of the natural process of micturition. Secondly, that in cases where there is evidence to show that the prostate has in the course of degeneration assumed the form and structure of a fibrous growth the conditions are such, provided the symptoms of obstruction warrant the adoption of other measures than catheterism, as to render some form of prostatectomy preferable to either vasectomy or castration. Thirdly, that where, as a consequence of sudden or protracted prostatic obstruction, secondary changes have taken place in the bladder itself, in the form of sacs, pouches, or trabeculation, the possibility of restoring its natural function by any means is extremely unlikely. Under such circumstances the induction of shrinkage of the enlarged gland will do good in affording a readier access for the catheter and in removing spasm, pain, or hæmorrhage connected with this or other similar process. In the succeeding paper I propose to illustrate the practice of vasectomy under the various conditions to which I have now referred as viewed at considerable periods after operation.

ILLUSTRATIONS OF VASECTOMY OR OBLITERATION OF THE SEMINAL DUCTS RELATIVE TO HYPERTROPHY OF THE PROSTATE AND BLADDER ATONY

WHEN sufficient grounds were furnished for asserting that the nutrition and growth of the prostate, whether normal or hypertrophied, might be importantly influenced by obliteration of the seminal ducts or by removal of the testes,* the first stage may be said to have been reached in a series of observations which will probably prove of increasing value in practical surgery. Though experience is not yet sufficiently ripe upon this point, there are good reasons for believing that a vasectomised or castrated male is not liable to undergo hypertrophy of the prostate in the ordinary acceptation of the term. As this point, as now seems probable, becomes

* "Surgery of the Hypertrophied Prostate," by Dr. J. W. White, "Transactions of the American Surgical Association," 1893.

more fully determined not only will a fact of great pathological importance be established, but it will be possible to indicate how by means of a simple and safe operation one of the most serious troubles of advanced life may be averted or controlled.

I have reserved for this paper some illustrations of vasectomy or, more strictly speaking, of obliteration of the seminal ducts by torsion, as described in the previous article, in its application to the treatment of prostatic hypertrophy. Statistical information gathered from the mere collection of a number of cases having but little in common is not of much assistance in a matter of this kind where the conditions and circumstances are so varied.

In taking my results of vasectomy I find they permit of being grouped as follows: First, where the effects are known to have been good, sufficient, and enduring; secondly, where they have been good but restricted to certain conditions; and, thirdly, where they are alleged to have been inadequate or negative. The question of mortality arising from the operation is not one requiring consideration, as in the series of over 100 cases referred to previously I stated that I have never seen harm follow.

The first group may be said to include cases of prostatic obstruction pure and simple, without any other structural complication. Here the bladder is

in no sense secondarily implicated structurally and is capable on the removal of the obstacle in front of it of both holding and expelling its contents. It is in this class of cases that shrinkage of the enlarged prostate, however induced, speedily leads to the restoration of the function of micturition in the fullest sense of the term. The group is best illustrated by cases where for some special or pressing reason the obliteration of the vasa was brought about at an earlier period in the history of prostatic obstruction than is usual. Hence this group is less numerous than the succeeding one where catheter life or the systematic use of this instrument had been resorted to previously. The following cases are selected.

A man, aged 68 years, seen in 1896, was suffering from the ordinary symptoms of enlarged prostate—namely, frequent micturition, more especially at night, some degree of residual urine, and occasionally incontinence, the diagnosis being confirmed by rectal examination. He had been advised to use a catheter but could not do so conveniently as he had lost an arm. Double vasectomy was performed, with an interval of ten days between each section. I saw him nearly three years afterwards ; the prostate was reduced in size. He was quite well, and had no occasion for the catheter.

About the same time I divided the vasa of a man aged 65 years, whose work was greatly interfered with by frequency of micturition due to enlarged prostate. He also had been advised to use a catheter. He was treated in the same way as the patient in the preceding case, with a similar result, and was examined eighteen months afterwards.

In 1897 I saw a man, aged 65 years, who in the course of his occupation travelled much by railway and otherwise. He had an enlarged prostate and much frequency of micturition for which he was advised to use a catheter. As this meant giving up his livelihood, vasectomy was practised with good results, and eighteen months afterwards he reported himself as being quite well without requiring the catheter.

Early in 1898 I saw a patient in consultation in whose case it had been necessary to tie in a catheter for retention of urine caused by a large prostate. This was so intolerable to him that I suggested vasectomy, which was performed. I saw him over two years after the operation and found him in good health and able to urinate normally. Six months after the operation I found the prostate much reduced in size.

In 1893 I operated upon a man, aged 67 years, for stone by litholapaxy. There was also some

enlargement of the prostate. He remained well till 1897 when symptoms of considerable enlargement developed, and though he had no recurrence of stone he gradually became entirely dependent upon the catheter, and was liable on slight provocation to attacks of cystitis and epididymitis. The frequent use of the catheter greatly interfered with his capacity and desire for an active outdoor life, and he was compelled to give up hunting and other exercises. In 1898 I divided both his vasa in the usual way with the result that his prostate symptoms gradually disappeared, and he resumed his hunting during the whole of last winter (1899) as he had previously done. He was able to give up his catheter, using it once in the twenty-four hours for washing out. He had accustomed himself to the latter as a precautionary method against stone, and though the process, he admitted, was hardly necessary he did not like to give it up.

This, I believe, is the first published series of cases of prostatic hypertrophy treated by operation, in which the object of preserving the normal function of micturition as opposed to an artificial one as illustrated by what is known as catheter life, appears to have been successfully demonstrated. Before leaving this group I would observe that in every case it was explained that the section or division of

the vasa might interfere with sexual possibilities. It may, I think, be claimed that in all these instances, and in others that might be mentioned, whatever influence, if any, was exercised on the sexual act the natural function of micturition was preserved to the person operated on, and the necessity for the permanent use of a catheter averted. When any question has arisen under these circumstances, so far as my experience goes, relative to whether the urinary or the sexual function should receive first and paramount consideration it has invariably been decided by the patient in favour of the former.

I pass to the second group of cases where I have described the effects following as being good but restricted to certain conditions. These include instances where structural changes in the bladder have supervened upon prostatic obstruction and where catheter life, or the necessity for it, has been more or less developed. This group provides by far the greater proportion of cases to which this class of operations has been recently applied. In the preceding paper I showed that there were certain structural effects which followed in the wake of prostatic and other forms of obstruction to the escape of urine by the natural passage which were irrecoverable from. These have reference to the bladder as a reservoir capable of self-expulsion.

Hence in the consideration of the class of operations of which vasectomy is a type, cause and effect must not be confused. The prostate may be rendered in these ways incapable of obstruction any longer, but this by no means implies that the bladder can be made to expel. And yet the realisation of the former by these means has in this way proved in many instances, which I will illustrate, an inestimable boon.

In November 1895 I operated on a man, aged 70 years, with a large prostate and increasing difficulty in catheterism which sometimes required hot baths and opiates before it could be effected. He had shaky hands, which increased the difficulty. I advised a double vasectomy. Twelve months after this he wrote to me: "I certainly am very much better than I was before the operation, and so long as I am quiet and able to carry out my regular treatment I get on very comfortably."

Another case was that of a man, aged 75 years, with a large prostate and increasing difficulty in passing his instrument. Double vasectomy was performed in 1898. He soon found that he could pass his catheter quite easily, and he again wintered abroad last year with much comfort. He had been previously obliged to forego this change by reason of catheter difficulties.

A man, over 60 years of age, whom I saw in consultation, and in whose case I advised vasectomy for enlarged prostate with frequent attacks of epididymitis which confined him to bed, has entirely got rid of the latter painful complication by the obliteration of his ducts, and is now again in the active practice of his profession.

The next case to which I shall refer is an instance of the application of vasectomy as an adjunct to other surgical purposes. It was that of a man, aged 70 years, whom I operated upon for stone in the bladder in 1893. The prostate was so large that I had unusual difficulty in performing the ordinary operation of litholapaxy, and after removing a considerable portion of the stone in this way I had to abandon it without effecting a complete removal of the calculus. The patient, however, did well and was much relieved. In the meantime I divided both vasa, and after six weeks interval I repeated the crushing operation. The considerable shrinkage that was thus effected in the size of the prostate rendered this proceeding easy and complete.

For the relief of hæmorrhage arising out of difficult catheterism in connection with prostatic obstruction vasectomy has been adopted with good effect in rendering the process easy and avoiding bleeding. This is only to be expected as the result

of a process which is generally admitted as reducing the blood-supply to the parts involved. Painful catheterism arising from spasm and tension as the instrument enters the prostatic urethra may be usually relieved in this way by the general shrinkage and relaxation of the gland that follows section of the vasa. I have had several illustrations of this. For reasons, such as are here illustrated, and for others that might be added to the group the obliteration of the vasa has proved of much service, though the voluntary and natural powers of the bladder may have either not been restored, or have been but partially restored. Easy and safe catheterism has in this way been substituted for that which previously was painful if not also dangerous.

I will conclude with a notice of the third group of results of vasectomy, which seems to me to include the most interesting and suggestive of the series that I have here brought under notice. I refer to those instances where the results are alleged to have been, or seem to have been, inadequate or negative.

For the purposes of this paper I have made numerous inquiries by letter, in addition to other sources of information, from patients who have undergone vasectomy since 1893, when I commenced to practise it with some frequency. Amongst these is a man, now aged 81 years, upon whom I per-

formed double vasectomy for prostatic enlargement of some years' standing early in 1897. On writing to me he informed me that he did not think he had derived much benefit from this operation. The history of his case, however, will hardly bear out this statement. The patient had been under my observation for four years previously to this. He had considerable irritation and spasm, for which the catheter was being constantly employed. There was also so much cystitis that I then drained his bladder by the perineal route with temporary benefit. In 1896, however, his condition in these respects became worse, and the bladder became very foul in spite of catheterism and washing out. In addition to this the specific gravity of the urine began to drop so as to vary from 1004 to 1007. As this condition so often precedes renal disease and uræmia in these cases of prostatic obstruction I divided the vasa early in 1897. From that time forward the urine, amongst other changes, gradually returned to a normal density and the general condition of the patient improved, though he continued to be, and still is, largely dependent on the catheter. He uses the instrument more easily and, as I am told by his friends, is in good general health. He doubtless failed to appreciate the renal improvement, which I have similarly observed in other instances as being probably con-

nected with mechanical reasons. The patient probably measured the success of the vasectomy, as others do, relatively as to whether he could or could not dispense with his instrument, without sufficient regard to the less striking contingencies of catheter life. This patient should probably occupy a place in the second group, but I thought it better to take him at his word as one whom vasectomy had not benefited. The substitution of a good contractile bladder for one that obstruction had worn out would probably suffice to complete the cure.

I will take one more instance which may properly be considered in this group from the patient's point of view, though, as with the preceding case, I decline to agree with the patient. It has its lesson to teach which may be the more conveniently learnt in this place.

A man, aged 74 years, was operated upon for stone by litholapaxy by me in 1894. The condition was complicated with a large prostate for which he had to use a catheter. The operation was not an easy one by reason of the former. He had two recurrences in the course of the two following years which I mainly attributed to the obstructing prostate, so I divided both vasa in 1896, with an interval of some weeks between each. He has had no recurrence of stone, can pass his catheter quite

easily, keeps free from cystitis, goes to Scotland to fish (a sport which he previously had to abandon), and is now not entirely dependent on the catheter. For a man at the age of 80 years I should say that he was in excellent health, and yet because he is not able to dispense with the instrument entirely, he is not disposed to admit that vasectomy did him much good.

My experience in litholapaxy, as illustrated in my last series of cases,* leads me to believe that vasectomy has proved an important aid in preventing the recurrence of stone after operation when complicated with enlarged prostate. It probably effects this by providing a free and more dependent exit from the bladder as well as by diminishing the large amount of tenacious mucus, which the enlarging prostate both provokes and helps to supply and which lessens materially as the gland shrinks.

I can hardly recall an instance of vasectomy or torsion of the vas for hypertrophy of the prostate where good has not followed, though it may not at once be appreciated by the patient. It is not always relative as to whether or not the patient can or

* A Further Contribution to the Surgery of Stone in the Bladder, including a Record (1890–97) of 110 Cases; treated by Litholapaxy (101), Perineal Lithotrity (3), Median Lithotomy (4), and Suprapubic Lithotomy (2), with four deaths.—*The Lancet*, Nov. 12, 1898.

cannot dispense with the catheter. Nor is credit always given in this group of cases to the fact that though chronic prostatic obstruction had already caused permanent structural damage to the bladder as the organ for expelling urine and not merely containing it, the further progress of an obstructive disease was arrested by obliteration of the vasa, and life was thus indefinitely preserved and rendered tolerable. Though in the case of the eye a cataract operation is successful this does not necessarily imply that spectacles can be invariably dispensed with.

In one instance benefit was slow in coming where the obstruction had previously been of a chronic character, and the bladder had become much weakened and fasciculated. It was found six months after a portion of one of the vasa had been excised and the ends ligatured in a loop, that the divided ends had reunited and the continuity and use of the duct had been re-established. I have the specimen, which I subsequently excised, and then torsed the freshly divided ends separately. Benefit followed upon this. The specimen was examined for me by Mr. J. G. Pardoe. I could hardly think, unless I had seen it, that this was possible; at all events I have not met with another instance.

Surgery may be said to be entering upon a new phase of research for therapeutical purposes. Thy-

roidectomy and oöphorectomy have produced results so remarkable and changes in the organism so profound that complete removal, except for the express purpose of saving life, is in the first instance condemned as totally inadmissible, and in the second instance is deprecated by a large and constantly growing number of surgeons.

The effect of castration on youthful males for the purposes of the harem has been known for centuries. The effect upon adult and aged men has only recently been investigated. In children the results are not dangerous to life; in the aged, apart from the shock of such a severe surgical mutilation, they are, in some cases at all events, dangerous to reason if not to life.

The explanation offered by physiology is the well known theory of "internal secretion." This theory, proved so strikingly correct in the case of the thyroid, may, although the testis is not a ductless gland, be equally applicable to the latter organ. In any case it is incontestable that most serious results follow total removal of both testes, whereas I can confidently assert from my seven years' experience of the operation that double vasectomy performed in the manner which I have described in the previous paper, causes no untoward results whatever.

THE REMOTE RESULTS OF STRUCTURAL LESIONS ("INTERVENTIONS SANGLANTES") IN URETHRO-STENOSIS.

I HAVE been asked to report to this Congress* with Professor Heresco of Bucharest, and Professor Albarran of Paris, on the remote effects of structural lesions (*interventions sanglantes*) employed in the treatment of stricture of the urethra. I think it will be generally admitted that these results are mainly determined by the nature of the wound and the circumstances under which it healed. For instance, incised and contused wounds and wounds that heal without any or with much inflammation, or with little or no provision for drainage, may be expected to yield different results. For this happens in all parts of the body. But in estimating the results of structural lesions of the urethra we must never loose sight of the fact that this canal conveys for several

* The Thirteenth International Congress of Medicine (Paris, 1900).

inches, at varying intervals, a compound and complex fluid which, under certain conditions not very clearly defined, is capable of exercising a highly poisonous effect on the tissues and fluids of the body with which it may accidently come in contact. This is evidenced by the frequency of rigors and fever not unlike a malaria after slight lesions, such as passing a catheter or dividing a stricture, by the sudden suppression of urine which is sometimes similarly occasioned, by the happening of serious, if not fatal, septicæmia later, and more remotely by the formation of a contractile scar at and about the seat of the wound. Surely we may say that the pathology of the urethra is a unique one.

To compare their results it will be necessary to define with some accuracy the kinds of wounds that preceded and their probable process of healing. For the purposes of this report the following varieties have been examined and carefully studied both during life and, as opportunity offered, after death : (1) lacerated or contused wounds as follow such methods of divulsion as were practised by Perrève * in Paris and Holt † in London ; (2) incised wounds

* Traité des Retrecissements Organiques de l'Urètre. Emploi Methodique des Dilateurs Mécanique dans le Traitement de ces Maladies, Paris, 1847.

† On the Immediate Treatment of Stricture, London, 1861.

from within the urethra as illustrated by Maisonneuve's* and other cases of internal urethrotomy; and (2) incised wounds from without inwards as described by Syme† of Edinburgh under the name of 'external urethrotomy' or perineal section.

1. Wounds inflicted by instruments for rapidly passing dilatation or rupture of a stricture are usually of a contused or lacerated character. When thus employed, unless the stricture is an annular or a diaphragm one, a condition which is rare, the canal usually gives way at a point in its circumference where the resistance is least, and this is naturally not the densest portion of the contraction. Hence these operation wounds real not unlike incidental lacerations of the urethra from injury, and in both instances the liability to stricture and to its recurrence is considerable. This was found to be so in cases examined both during life and after death and repeated operations by dilatation appear to have been followed by additions to the amount of contractile scar-tissue at or about the seat of stricture. There is, however, a form of stricture where division is not open to these objections as regards its more remote effects. Reference is here made to what are known as peri-urethral or submucous strictures. My attention

* 'Urethrotomie interne,' Paris, 1853.

† 'On the Treatment of Stricture by External Incision,' 1851.

was first called to them some years ago by examining a patient who died from some other cause shortly after (within a week) a tight stricture in the deep urethra had been divulsed by Holt's method. The stricture was found to be peri-urethral and it thus compressed the mucous coat as a ligature round it would do. The effects of the divulsion had been to rupture the fibres of the stricture whilst it left the mucous lining almost intact. Mr. Christopher Heath * has also recorded a similar observation. I am inclined to think that the consequence of its casual application to this class of cases and the excellence of the results was that Holt's operation attained a position regarding the treatment of strictures generally which it hardly appears to have merited. No better result relative to the permanency of the cure can be desired than this, and if it were possible to limit divulsion to peri-urethral strictures I belive this operation would still be frequently employed. I have examined several urethras many years after Holt's operation had been performed where the canal had maintained its full measurements and no trace of a lesion of the mucous membrane could be found. We may claim these as instances of the successful treatment of stricture by subcutaneous, or rather submucous, methods.

* *Brit. Med. Jour.*, July 17, 1869.

2. The remote effects following internal urethrotomy are of a variable character, arising mainly from the nature of the cicatrix or scar-tissue that follows the operation. In some instances I found from examination after death several years afterwards that no signs of the original stricture were discoverable either in the mucous membrane itself or in the submucosa. As far as I could ascertain the incision made by the urethrotome had soundly healed without leaving any mark or contraction. As illustrating this class of cases I will select one that has recently come under my observation where the previous history was well authenticated throughout. It was that of a man, aged fifty-three years, whom I saw in February, 1900. He was operated upon in 1883 by the late Mr. Berkeley Hill for a stricture in the deep urethra which would only then admit a filiform bougie. Internal urethrotomy was performed. I saw and examined this patient with Mr. C. B. Lockwood, who had been personally acquainted with him throughout. I could find no evidence of stricture. The patient had ceased to use a bougie for some years. There could be no question that this man had been permanently cured by the operation.

On the other hand, the majority of instances examined showed in varying degrees that a tendency to relapse occurred within a few weeks or months

after the operation, even where patients had endeavoured to prevent this by the use of a bougie. In these, for the most part, there were signs that the wound inflicted had probably been an irregular or jagged one, more resembling a lacerated wound than an incised one, and not what would be expected from a well-constructed urethrotome. Further, the resulting cicatrix often presented an appearance not unlike what happens after a burn of the second or third degree, or as I have seen following electrolysis for stricture.

In some instances of recurrence after internal urethrotomy it was apparent that this operation had only partly divided the stricture. From the evidence that was afforded by this class of cases it was concluded that the combination of partial incision of a stricture by internal urethrotomy, followed immediately by stretching of the wound thus made by divulsion or bougies, did not yield good permanent results. It was in some of these cases that recurrence took place most speedily and in an aggravated form.

3. The third group of cases examined were those where the stricture was divided from without inwards on a grooved staff in accordance with Syme's description of external urethrotomy or perineal section. In several instances where this operation had been

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and how much to the

* "Surgical Diseases of the Urinary Organs," fourth edition, p. [illegible].

drainage which the external wound provided ; but it seemed probable that both contributed to this end.

Taken as a whole, these investigations support a conclusion that most strictures treated in the three ways referred to, show a tendency to re-contraction in varying degrees. In some this liability was easily counteracted by the use of bougies after the operation, though practically it could not be said that there was any time limit to this expedient. In others the tendency to relapse was so rapid and strong as to require repeated operations to maintain the dimensions of the canal, or even to necessitate the formation of a urinary fistula in place of the urethra. In a few instances, after rapid divulsion, internal urethrotomy, and perineal section or external urethrotomy, the evidence was conclusive that a permanent cure had resulted, and in such cases the subsequent use of a bougie appeared precautionary rather than necessary. It must, however, be stated that, compared with the large number of stricture cases which were investigated for this purpose, and where the observations extended over a considerable number of years under favourable circumstances for conducting such an inquiry, the instances last mentioned were rare. These conclusions will, I think, correspond with the experience of most surgeons.

I take it that the object of this report is not

merely to reiterate a foregone conclusion but to explain, if possible, how these variations may have happened, and how both good and indifferent results may alike contribute to advance knowledge in connection with this subject. In examining the lesions thus made for the treatment of certain forms of stricture by urethrotomy, and I include both varieties of operation under this term, it was evident that some of them had been faulty in their application and in their construction relative to the process of healing which would follow. In a few instances appearances indicated that the incision or incisions had not been accurately applied to the constriction, that the urethrotome had lacerated rather than cut, that several wounds had been made in various directions, and thus by scar-tissue the obstruction was rather added to than lessened by what had been done. This was probably directly due to faulty instruments in the case of internal urethrotomy and to want of precision and completeness in carrying out the details of perineal section. Though some failures may be accounted for in these ways, more were evidently due to the conditions under which healing proceeded after the operation. Many of the incisions that were made for the purposes of internal urethrotomy were inadequately provided with means for proper drainage, having regard to their extent, whilst some cases of

perineal section or external urethrotomy were hardly any better off in this respect.

About the time I commenced to make these observations on a somewhat extended scale internal urethrotomy was being practised with a very free hand. The late Professor Otis, of New York, had recently formulated his views relative to the male urethra which to some extent were responsible for this. Though fully recognising the value of his work in demonstrating the greater capacity of the male urethra and the important influence that this had on the new lithotrity or litholapaxy which Bigelow was developing in the wake of Otis's investigations, I could not follow him in the practical application of it, in its entirety, to the treatment of stricture. However, it tended in the direction of increasing the range of internal urethrotomy as well as the size of the wounds thus made, but I cannot say that it proportionately added to the number of cures in chronic stricture of the deep urethra. It struck me in examining cases which had been thus operated on some years previously by various surgeons where the stricture had recurred that the size or depth of the wound so made was out of proportion to the facilities for drainage, whilst healing was going on, which the urethra alone afforded. In the absence of the latter condition I recognised one reason for the contractile

condition of the scar that resulted. In arriving at this conclusion I was much influenced by what I had observed in connection with the treatment of accidental lacerations of the deep urethra by perineal incision and drainage.

It may be generally stated that the worst forms of strictures are those following laceration of the urethra, and considering the circumstances under which such lesions usually heal this is not to be wondered at. Repair goes on slowly under the irritating influence of constant contact with confined urine, and excessive exudation about the seat of the wound takes place. This eventually, in conjunction with the irregularity caused by the wound, forms a stricture of the closest and most contractile character. On the other hand, in cases where perineal section and drainage were applied, this either did not happen at all or to a much more limited extent. In some instances where this principle was adopted in the case of ruptures of the deep urethra, healing took place just as kindly as it usually does after a median cystotomy, and no stricture followed. This I proved in many instances. It seemed reasonable to conclude that the treatment of stricture by section, or division of the stricture, might be improved by providing better drainage for urine and the discharges from a wound which can only be imperfectly treated antiseptically.

I am not aware that the influence of urine-drainage and irrigation in relation to the healing of wounds of the urethra and the kind of scar-tissue that results have ever been adequately discussed in connection with the operative treatment of urethral stricture. With the view of meeting what I consider to be causes of failure and recurrence following some operations, I published* a series of cases and observations where I had combined the principles of internal and external urethrotomy in the treatment of certain forms of urethral stricture which on the whole have afforded good results. I shall best illustrate this practice by a typical case which was recorded and watched for a considerable number of years.

A man, aged fifty-one years, whom I saw and operated upon in 1890, had been the subject of a stricture with a strong tendency to contract for some years, and had undergone no less than six operations for it, including a divulsion by Holt's method, and five internal urethrotomies at various intervals and places. For some months before I saw him the stricture had been contracting and closing in spite of the patient's well-directed efforts with suitable bougies to keep it open. Straining to urinate was constant and prevented continuous sleep, and there was some cystitis with probably pyelitis. I performed an in-

* *Brit. Med. Jour.*, July 18, 1885.

ternal urethrotomy with Teevan's modification of Maissonneuve's instrument, as I thought that the latter might not stand the strain put upon it by the cartilaginous character of the tissues which had to be divided. This being done I passed a full-sized grooved staff (No. 12 English) into the bladder. As the staff was evidently gripped in the deep urethra the patient was placed in the lithotomy position and I divided in the median line from without inwards such contracted tissues as remained. I thus opened the urethra and found by passing my finger first into the bladder and then hooking it forwards along the urethra in the direction of the penile orifice that the walls of the canal had now been rendered free and unresisting. A full-sized gum elastic drainage-tube, such as I have elsewhere described* was passed into the bladder through the wound and retained. The parts were washed out with a solution of perchloride of mercury (1 in 6000.) The stiff drainage-tube was withdrawn on the sixth day and a soft rubber one fitted with a tap for the voluntary withdrawal of urine was substituted which was worn for a fortnight longer and then finally removed, when the wound soon healed. Ten years have now elapsed since this operation was practised. The patient remains in good health and suffers no further inconvenience

* Op. cit.

from his urinary organs than having occasionally to pass a full-sized bougie for himself.

It may be thought that the retention of a catheter in the bladder for some time after an internal urethrotomy has been practised is to be preferred to an external urethrotomy, and a perineal tube for drainage alone. In some instances the former may suffice, but in the majority of cases where a urethrotomy becomes necessary it will be found an imperfect substitute. The mechanism for the retention of a catheter along the whole length of the urethra and the irritation it excites are often obstacles to the successful employment of this expedient.

The conclusions arrived at from the examination of structural lesions used in the treatment of urethral strictures as detailed in the foregoing remarks may be summed up as follows.

1. That there is evidence to show that in peri-urethral strictures of the deep urethra the effects of divulsion as practised in Perrève's and Holt's operations may be limited to rupturing the dense stricture bands in the submucosa of the urethra, whilst the mucous membrane itself escapes any serious injury or laceration and is merely restored by stretching to its original dimensions. Here a permanent cure may result. On the other hand, where the mucous membrane is in itself the seat of stricture and forms part

of the latter structurally it is necessarily torn or lacerated by the process of a sudden divulsion, and the pathological condition consequently becomes assimilated with that of traumatisms of the urethra from external violence accidentally applied which are followed by strictures of the most contractile and recurrent form.

2. That there is evidence to indicate that where the entire thickness of a stricture can be included within an incision of moderate dimensions made by an internal urethrotome the normal calibre of the urethra may be completely and permanently restored. Where this happens it may be concluded that all the fibres of contraction constituting the stricture were divided at the time of operation. And further that the converse is equally true. There is also evidence to show that the absence of recurrence under such circumstances is not necessarily dependent on the use of a bougie, though the latter is a precautionary measure which should invariably be advised.

3. That in the case of multiple strictures or strictures of the deep urethra of considerable dimensions either in their length or thickness treated by an internal incision of corresponding proportions, apart from other considerations, the tendency to recontraction and recurrence, with an additional amount of cicatricial material, is frequent; the latter being

probably due to the circumstances under which healing takes place in wounds of these dimensions so situated.

4. That lesions of the urethra demonstrate in various ways the poisonous effects that unprotected and confined urine is capable of exercising both on the body generally and on the tissues in contact with it, and that the liability to such effects is greatly diminished where drainage and irrigation render these conditions of the urine unlikely.

5. That in the case of recurring strictures previously treated by incision and in primary strictures of such length or extent as to require an internal section of a corresponding size, or as to which there might be doubt as to whether it would be safely possible so to include them, for the purposes of the operation and its results such wounds should be made with due regard to other surgical principles in addition to the one pertaining to the division of the contraction.

6. That there is direct evidence to show that the tendency to recontraction and recurrence of stricture after internal urethrotomy is largely diminished by the concurrent employment of systematic and efficient urine and wound drainage such as the combination of external urethrotomy, or perineal puncture, affords.

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